

TCAD Simulation of Radiation Hard n-MCz and n-Fz Si Microstrip Detector for the HL-LHC

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Radiation damage of the silicon strip detectors in the HL-LHC experiments pretenses a major task for its reliable long –term operation of the experiment. Radiation hard Si detectors have used in the new CMS tracker detector at HL-LHC in 2026. It has been observed that n-MCz and n-Fz Si as a material can be used for the Si microstrip detector. The strip detector design for this material should be simulated using TCAD simulation and optimized to get the high CCE. In order to understand the charge collection behavior of the n-MCz/n-Fz Si detector, we have compared the radiation damage effects in the mixed irradiated n-MCz Si and neutron irradiated n-Fz Si microstrip detector equipped with metal overhang and multiple guard rings.

In this paper, we have shown an optimal design of the radiation hard n-MCz Si/n-Fz Si strip detector design for the HL-LHC experiment in order to get high CCE.

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